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EXAMINER	
TRUONG, THANHNGA B	
ART UNIT	**PAPER NUMBER**
2135	

DATE MAILED: 06/17/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/756,814	SHORT, KEVIN M.	
	Examiner	Art Unit	
	Thanhnga B. Truong	2135	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *18 March 2005*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-32* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-32* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *11/04/2002* is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

1. Applicant's amendment filed on March 18, 2005 has been entered. Claims 1-32 are pending. Claims 9-11, 16-18, 20-23, and 30-32 are also amended by the applicant. Therefore, the new ground(s) of rejection is applied to claims 11-32. The rejection for claims 1-10 are still maintained in this office action.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

3. Claims 1-10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Barnsley et al (US 4,941,193), and further in view of Bristol (US 5,774,385) and Boothroyd Chaos Systems: Electronic Applications Reap the Benefits.

a. *Referring to claim 1:*

i. Barnsley teaches:

(1) choosing an image file to be compressed and decomposing it into slices; finding a trend line for each slice and calculating trend line information describing the trend line; calculating for each slice a detrended image slice, by subtracting from each slice its trend line and storing the trend line information describing the trend line; choosing a chaotic system; applying selected digital initialization codes to the chaotic system such that each initialization code produces a periodic orbit and stabilizes the otherwise unstable periodic orbit; generating a basic waveform for each periodic orbit such that the basic waveform is in a one-to-one correspondence to the initialization code for the periodic orbit; selecting basic waveforms to be used with each detrended image slice and storing their corresponding initialization codes; transforming the detrended image slice and the selected basic waveforms to a proper frequency range and storing frequency information describing the transformation; calculating weighting factors to create a weighted sum of the

selected basic waveforms to approximate each detrended image slice and storing the weighting factors; and combining the stored trend line information, the stored initialization codes, the stored frequency information and the stored weighting factors for each detrended image slice to comprise a compressed image file **[i.e., the image is basically represented by a matrix of coefficients of affine transformations. The coefficients are then used to recreate the image. In one preferred embodiment, a chaotic dynamical system is set up to utilize the affine coefficients and reproduce an attractor. Because the mathematics provides a compact way to store the characteristics of an object, this approach compresses the content of an exact image into just a few coefficients. The present invention disclosed herein is believed capable of encoding high resolution graphic images exactly (or inexactly, if desired) at compression ratios better than 10,000:1 for some images. The methods can be used with classical compression techniques to increase yields (column 4, lines 58-67 through column 5, lines 1-3). Furthermore, Barnsley teaches the important point is that two closed and bounded sets are more and more nearly the same set the smaller the Hausdorff distance between them. In saying that they are nearly the same, we mean that they look alike at a fixed resolution.stated in yet other words, an acceptable or satisfactory set of IFS codes for a given input image has been found when the Hausdorff distance between the given input image and the image reproduced by decoding a set of IFS codes is a minimum for the resolution of the display screen. It is also considered an advantage provided in the present invention that the IFS representations are stable. The method and means described herein are stable in the sense that small changes in coefficients in the IFS codes correspond to small changes in the decoded data. This robustness is not shared by other commonly used exact compression codes known in the art (column 18, lines 12-29)]. For more details associate with stabilizing of chaotic attractors, see column 5, lines 64-67 through column 6, lines 1-37.**

ii. However, Barnsley does not mention:

(1) about the use of orbits which associates with chaotic attractors.

(2) about the use of the trend line and its calculation.

iii. Boothroyd teaches:

(1) the same basic idea of self-similarity that enables Barnsley and Sloan to manipulate image files **(Barnsley, Column 3, lines 48-55)** also allows Mackenszie and Sandler to manipulate audio files **(see Boothroyd, pages 22 Column 2, last paragraph).**

Bristol teaches:

(2) an apparatus compresses a data stream having a plurality of data samples into a series of best fit trend line segments **(column 4, lines 12-14)**. In addition, the compression method executed by the instructions stored in the program memory 36 is identified as a Rolling pivot, Swinging Door, Trend Compression Method. The method operates within the above-described apparatus to receive a digital data stream, compress the digital data stream, and generate an output stream of compressed data. The output stream of compressed data consists of best-fit line segments, identified as trend line segments, which provide an approximation of the input data stream. The Rolling pivot, Swinging Door Trend Compression Method is based on a concept that an approximation of a set of data points can be computed from the data points of a set that constitute only the boundary points (defined as vertex points) of the convex hull of trend data **(column 5, lines 61-67 through column 6, lines 1-7).**

iv. It would have been obvious to a person having ordinary skill in the art at the time the invention was made to:

(1) have applied Barnsley's teachings to the image files of Boothroyd to provide for compression in audio files as well as image files. The same four reasons to obtain compression for image files that Barnsley recites in **(column 1, lines 34-45)** for compression of image files, would be equally valid for image files.

(2) have applied Barnsley's teachings to the data compression of Bristol to provide for compression a data stream for transmission, display or storage **(column 1, lines 9-10 of Bristol).**

v. The ordinary skilled person would have been motivated to:

(1) include the work of Barnsley and Boothrooyd in terms of chaotic attractors (strange attractors) in which the attractor has almost periodic orbits **(page 22, first Column last complete paragraph and figure 2).** Note the choice of discussing chaotic attractors in terms of their orbits are in terms of fractal geometry (as opposed to Euclidian) is a matter of convenience than substance. Barnsley is teaching compression of image files in which a geometric approach is in order whereas audio files can be discussed in terms of specific orbits of the attractor. With the use of the word periodic orbit in the phase space representation of the chaotic attractor we can move to the more traditional use of the term waveforms in the time domain.

(2) generate the best fit line segment of all data samples of the data stream received by the computer since the last segment end condition thereby compressing segments of the data stream **(column 4, lines 8-11 of Bristol).**

b. *Referring to claim 2:*

i. Barnsley further teaches:

(1) the steps of removing from the weighted sum of the selected basic waveforms any selected basis waveforms not deemed necessary to approximate sufficiently well the image file and of removing the corresponding stored initialized codes **[i.e., accordingly, it is an object of Barnsley's invention to develop image compression methods and apparatus whose input is a data string, corresponding to a two-dimensional array of numerical attributes of a digitized picture, and whose output is a shorter string from which the original can be regenerate exactly or approximately (column 9, lines 17-23). The method of Barnsley's invention also possesses a remarkable stability property, small magnitude errors in compression codes lead to small error in the corresponding decoded image. This feature is not shared to a significant extend by any other exact image compression algorithm (column 9, lines 8-15)].**

c. *Referring to claim 3:*

i. Barnsley further teaches:

(1) the step of identifying trends over sections of compressed image file and replacing the stored weighting factors for the sections of compressed image file by a suitable function **[i.e. Barnsley teaches the use of polynomial (function) to approximate recurring image elements in image compression (column 21, lines 34-36)].**

ii. However, Barnsley silent upon its use for image file compression, Boothroyd teaches:

(1) these principles through self-similarity may be applied to image data files **(see page 22, the discussion of the work of Mackenzie and Sandler in Boothroyd's Chaos systems).**

iii. It would have been obvious to a person having ordinary skill in the art at the time the invention was made to:

(1) have applied Barnsley's teachings to the image files of Boothroyd to provide for compression in audio files as well as image files.

iv. The ordinary skilled person would have been motivated to:

(1) combine the teachings because it would have given rises to compressed image files almost indistinguishable from the original.

d. *Referring to claim 4:*

i. This claim has limitations that is similar to those of claim 3, thus it is rejected with the same rationale applied against claim 3 above.

e. *Referring to claims 5, 8:*

i. These claims have limitations that is similar to those of claim 1, thus they are rejected with the same rationale applied against claim 1 above.

f. *Referring to claim 6:*

i. This claim has limitations that is similar to those of claim 2, thus it is rejected with the same rationale applied against claim 2 above.

g. *Referring to claim 7:*

i. This claim has limitations that is similar to those of claim 3, thus it is rejected with the same rationale applied against claim 3 above.

h. *Referring to claim 9:*

i. Barnsley further teaches:

(1) choosing a compressed image file; stripping stored initialization codes out of the compressed image file and applying the stored initialization codes to a chaotic system substantially the same as the chaotic system used in producing the compressed image file to produce the corresponding basic waveforms; stripping the stored frequency information out of the compressed image file and using the stored frequency information to transfer the basic waveform to the proper frequency range; and combining the basic waveforms according to the stored weighting factors to produce a detrended image slice; stripping the trend line information out of the compressed image file and using the trend line information to regenerate a trend line to add to the detrended image slice to produce an approximation of an original image slice **[i.e., these limitations are similar to those of claim 1, thus they are rejected with the same rationale applied against claim 1 above. Furthermore, it is another object of Barnsley's invention to provide a parallel image processor for carrying out a random iteration method and a deterministic iteration method of image decompression based on iterated function systems (column 10, lines 12-19). In addition, it should be understood and appreciated that small changes in the parameter values or IFS codes yield only small changes in the resultant expanded or decompressed image (column 19, lines 26-29). Lastly, It should be mentioned at this point in the discussion of FIG. 9 that the method for obtaining an optimum set of IFS codes is itself an iterative process. Accordingly, the preferred method of obtaining such an optimum set of IFS codes comprises taking the IFS codes representing the original input image and decoding them to form an approximation of an image, and adjusting the IFS codes until the approximate image is sufficiently close to the original input image. Thus, the preferred embodiment of an image compression system 10 includes a decoder 20, which is described in greater detail in connection with FIGS. 10 and 11. The decoder 20 is**

also known as an "iterated function system image synthesizer" or IFSIS, because it is useful to produce images in response to being provided numbers which represent IFS codes. In fact, the IFSIS decoder 20 will produce images even if it is provided meaningless numbers as inputs; of course, its principal utility is to produce decoded images in response to being provided IFS codes which were obtained by compressing an input image (column 20, lines 17-67 through column 21, lines 1-4)].

i. *Referring to claim 10:*

i. This claim has limitations that is similar to those of claim 9, thus it is rejected with the same rationale applied against claim 9 above.

4. Claims 11, 12, 16-25, 28-32 are rejected under 35 U.S.C. 103(a) as being unpatentable over Barnsley et al (US 4,941,193), further in view of Barnsley et al (US 5,347,600), hereinafter (Barnsley-600), and further in view of Boothroyd Chaos Systems: Electronic Applications Reap the Benefits.

a. *Referring to claim 11:*

i. Barnsley teaches:

(1) causing the chaotic system (i.e, mathematical operations) to assume a periodic orbit by applying an initialization code to the chaotic system; generating a periodic waveform for the periodic orbit; weighting the periodic waveform to approximate at least a portion of the data signal; and merging the initialization code and a representation of the weighting, to compress the portion of the data signal [i.e., the limitations are met on column 5, lines 4-30 of Barnsley].

ii. However, Barnsley does not mention:

(1) about the use of orbits which associates with chaotic attractors.

(2) about the compression of portion of data signal.

iii. Boothroyd teaches:

(1) the same basic idea of self-similarity that enables Barnsley and Sloan to manipulate image files **(Barnsley, Column 3, lines 48-55)** also

allows Mackenszie and Sandler to manipulate audio files **(see Boothroyd, pages 22 Column 2, last paragraph).**

Barnsley-600 teaches:

(2) the compressed data set is formed in a digital computer by a process of repeated comparisons between image data representing different small pieces of the image, known as domain blocks and shrunken range blocks, and recording the addresses of optimal matches. The image is decoded by an inverse process. The preferred embodiment of Barnsley-600's invention employs mathematical operations known as local affine transformations. These transformations are employed in the process of encoding digital data representing an image. The encoded output constitutes a "fractal transform" of an image and consists of coefficients of the affine transformations. Different fractal transforms correspond to different images. The fractal transforms are iteratively processed in the decoding operation. Contrary to intuitive expectation, it has been discovered that if the encoding and decoding procedures of the invention are followed, the original image, or an image that looks like the original image, is produced after a finite number of iterations (column 5, lines 37-56). Furthermore, Barnsley teaches an address sequencer in the memory interface 610, using the format register value, generates addresses in the program data RAM 606 to store the image codes which are transmitted from the host interface 600 into the memory interface 610. The program data RAM 606 consists of 4096 memory locations, each one byte wide. An image code may consist of up to 2048 codes, each of which occupies two bytes of the program data RAM. CODELENGTH, the number of two-byte program data RAM words which contain valid data, is the square of (the value in image size divided by the value in format). CODELENGTH varies between 256 and 2048 as the value in format varies between 4 and 16. The sixteen bits of the first CODELENGTH words in the program data RAM contain both address and transform information (column 25, lines 32-46 of Barnsley-600). An initialization code can also be met on column 26, lines 42-67 through column 27, lines 1-3 of Barnsley-600).

iv. It would have been obvious to a person having ordinary skill in the art at the time the invention was made to:

(1) have applied Barnsley's teachings to the image files of Boothroyd to provide for compression in audio files as well as image files. The same four reasons to obtain compression for image files that Barnsley recites in **(column 2, lines 1-24)** for compression of image files, would be equally valid for image files.

(2) have combined the teaching of Barnsley-600 into the teaching of Barnsley to provide a means for expanding images to higher resolution.

v. The ordinary skilled person would have been motivated to:

(1) include the work of two Barnsleys and Boothroyd in terms of chaotic attractors (strange attractors) in which the attractor has almost periodic orbits **(page 22, first Column last complete paragraph and figure 2).** Note the choice of discussing chaotic attractors in terms of their orbits are in terms of fractal geometry (as opposed to Euclidian) is a matter of convenience than substance. Both Barnsley and Barnsley-600 are teaching compression of image files in which a geometric approach is in order whereas audio files can be discussed in terms of specific orbits of the attractor. With the use of the word periodic orbit in the phase space representation of the chaotic attractor we can move to the more traditional use of the term waveforms in the time domain.

b. *Referring to claim 12:*

i. This claim has limitations that is similar to those of claim 11, thus it is rejected with the same rationale applied against claim 11 above.

c. *Referring to claims 16-17, 28-29:*

i. These claims have limitations that is similar to those of claim 1, thus they are rejected with the same rationale applied against claim 1 above.

d. *Referring to claims 18-25, 30-32:*

i. These claims have limitations that is similar to those of claims 11-12, thus they are rejected with the same rationale applied against claims 11-12 above.

5. Claims 13-15 and 26-27 are rejected under 35 U.S.C. 103(a) as being unpatentable over Barnsley et al (US 4,941,193), further in view of Barnsley et al (US

5,347,600), further in view of Boothroyd Chaos Systems: Electronic Applications Reap the Benefits, and further in view of Bristol (US 5,774,385).

a. *Referring to claim 13:*

i. Barnsley further teaches:

(1) identifying a trend in the portion of the data signal; and removing the trend from the portion of the data signal.

ii. Barnsley, Barnsley-600, and Boothroyd teach the claimed subject matter, however, they are silent about the use of the trend line and its calculation. On the other hand, Bristol teaches:

(1) an apparatus compresses a data stream having a plurality of data samples into a series of best fit trend line segments **(column 4, lines 12-14)**. In addition, the compression method executed by the instructions stored in the program memory 36 is identified as a Rolling pivot, Swinging Door, Trend Compression Method. The method operates within the above-described apparatus to receive a digital data stream, compress the digital data stream, and generate an output stream of compressed data. The output stream of compressed data consists of best-fit line segments, identified as trend line segments, which provide an approximation of the input data stream. The Rolling pivot, Swinging Door Trend Compression Method is based on a concept that an approximation of a set of data points can be computed from the data points of a set that constitute only the boundary points (defined as vertex points) of the convex hull of trend data **(column 5, lines 61-67 through column 6, lines 1-7).**

iv. It would have been obvious to a person having ordinary skill in the art at the time the invention was made to:

(1) have applied Bristol's teachings into the data compression of Barnsley, Barnsley-600, and Boothroyd's systems to provide for compression a data stream for transmission, display or storage **(column 1, lines 9-10 of Bristol).**

v. The ordinary skilled person would have been motivated to:

(1) have applied Bristol's teachings into the data compression of Barnsley, Barnsley-600, and Boothroyd's systems to generate the best fit line segment of all data samples of the data stream received by the computer since the last segment end condition thereby compressing segments of the data stream **(column 4, lines 8-11 of Bristol).**

b. *Referring to claim 14:*

i. This claim has limitations that is similar to those of claim 13, thus it is rejected with the same rationale applied against claim 13 above.

c. *Referring to claim 15:*

i. This claim has limitations that is similar to those of claims 11-13, thus it is rejected with the same rationale applied against claims 11-13 above.

d. *Referring to claims 26-27:*

i. These claims have limitations that is similar to those of claim 13, thus they are rejected with the same rationale applied against claim 13 above.

Response to Argument

6. Applicant's arguments filed March 28, 2005 have been fully considered but they are not persuasive as set forth for claims 1-10.

Applicant argues that:

Individually or in combination, Barnsley et al fail to suggest or teach the recited initialization code(s), periodic orbit(s), generated periodic waveform(s), and/or uses thereof.

Examiner totally disagrees with the applicant and still maintains that:

The combination of Barnsley, Boothroyd, and Bristol teach the claimed subject matter. As mentioned in the previous office action and repeats herein that Barnsley teaches the compression and decompression techniques ofr digital image data using chaotic system (column 5, lines 4-62). However Crouse is silent on the use of orbits which associates with chaotic attractors and about the use of the trend line and its calculation, whereas Boothoyd and Bristol teaches these limitation and the rejection is addressed above.

Barnsley, Boothroyd, and Bristol do not need to disclose anything over and above the invention as claimed in order to render it unpatentable or anticipate. A recitation of the intended use of the claimed invention must result in a structural difference between the claimed invention and the prior art in order to patentably distinguish the claimed invention from the prior art. If the prior art structure is capable of performing the intended use, then it meets the claimed limitations.

For the above reasons, it is believed that the rejections should be sustained.

Conclusion

7. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Thanhnga (Tanya) Truong whose telephone number is 571-272-3858.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Kim Vu can be reached on 571-272-3859. The fax and phone numbers for the organization where this application or proceeding is assigned is 703-872-9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 571-272-2100.

TBT
June 11, 2005

KIM VU
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2100